



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular

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## TITLE 14 OF THE CODE OF FEDERAL REGULATIONS (14 CFR) GUIDANCE MATERIAL

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**Subject: INDEX OF AVIATION TECHNICAL  
STANDARD ORDERS**

**Date: 10/10/00  
Initiated by: AIR-120**

**AC No: AC 20-110L  
Change:**

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**1. PURPOSE.** This advisory circular (AC) describes the public procedures the Federal Aviation Administration (FAA) will use to develop and issue Technical Standard Orders (TSO) for aeronautical articles to be used on civil aircraft. The AC presents an index of the FAA TSO's that contain minimum performance standards for specified materials, parts, processes, and appliances used on civil aircraft.

**2. CANCELLATION.** Advisory Circular 20-110K, Index of Aviation Technical Standard Orders, dated September 22, 1999, is canceled.

**3. RELATED FEDERAL REGULATION SECTIONS.** Title 14 of the Code of Federal Aviation Regulations (14 CFR), Part 21, Subpart O.

**4. BACKGROUND.** On June 2, 1980, by Amendment 21-50 to 14 CFR Part 21, the FAA adopted a new public procedure for issuing TSO's for specified materials, parts, processes, and appliances used on civil aircraft, relocated the substance of Subpart A of 14 CFR Part 37 to Subpart O of 14 CFR Part 21, and revoked the remainder of 14 CFR Part 37. Amendment 21-50 became effective on September 9, 1980.

**5. PUBLIC PROCEDURE.** The following is the public procedure the FAA will use to develop and issue final TSO's for specific articles used on civil aircraft.

a. The FAA will continue to develop proposed TSO's and will use, by reference in the TSO, documents prepared and issued by organizations such as the RTCA, Inc. (RTCA) and the Society of Automotive Engineers (SAE). Notices of RTCA meetings and invitations will continue to be published in the Federal Register to allow public participation at the early stages of document development.

b. Copies of documents prepared and issued by an organization that are incorporated by reference in proposed or final TSO's will be made available to interested persons in accordance with FAA regulations.

c. Any person may request the Administrator to revise or issue a new TSO by submitting a description of the revision sought or a description of the new article for which a TSO is requested.


d. The FAA will use several methods to ensure that the public is afforded early opportunities to take part in the TSO decision making process. Proposed TSO's are normally distributed to the public for comment through the use of mailing lists. Any individual or organization can request to be placed on the TSO mailing lists. A notice of availability for comment of each proposed TSO is published in the Federal Register, and a copy of each final TSO is mailed to all persons on the mailing list.

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e. Any person wishing to submit comments on a proposed TSO may do so. The Administrator will consider all comments received on or before the closing date for comments before issuing a final TSO. Late comments may also be considered as long as no additional expense or delay in processing the TSO is incurred.

f. All comments submitted will be available, both before and after the closing date for comments, for examination by interested persons. Comments are located at the FAA Headquarters in the Aircraft Certification Service, Aircraft Engineering Division (AIR-100), Room 815, 800 Independence Avenue, SW, Washington, DC 20591, between 8:30 a.m. and 4:30 p.m. Monday through Friday.

g. Copies of proposed TSO's, FAA Resolution of Comments, and final TSO's will also be available at AIR-100, and at all FAA Regional Aircraft Certification Offices. Final TSO's will not be published in the Federal Register.

  
James C. Jones  
Manager, Aircraft Engineering  
Division, AIR-100

6. **INDEX OF TSO's.** For the reader's convenience, the index of TSO's is presented in numerical sequence (appendix 1) and by subject matter (appendix 2). All TSO standards contained in 14 CFR Part 37, Subpart B, as of September 9, 1980, are current under the TSO revision program, unless appendix 1 of this AC shows a later revision date.

7. **HOW TO OBTAIN TSO's.** To obtain official copies of the TSO's listed in appendices 1 or 2 write to: U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75<sup>th</sup> Avenue, Landover, MD 20785. Computer users with Internet access may view and/or obtain unofficial electronic copies of the TSO's by accessing the AIR website at <http://www.faa.gov/avr/air/airhome.htm>. To have your name placed on our mailing list to receive future issuances of TSO's, notices for public comment on proposed TSO's, or copies of proposed TSO's, write to: FAA, AIR-100, 800 Independence Avenue, SW, Washington, DC 20591.

**APPENDIX 1. INDEX OF TSO's IN NUMERICAL SEQUENCE**

<b>TSO NUMBER</b>		<b>SUBJECT TITLE</b>
TSO-C1c	7/10/87	Cargo Compartment Fire Detection Instruments
TSO-C2d	6/14/89	Airspeed Instruments
TSO-C3d	6/14/89	Turn and Slip Instrument
TSO-C4c	4/1/59	Bank and Pitch Instruments
TSO-C5e	6/14/89	Direction Instrument, Non-magnetic (Gyroscopically Stabilized)
TSO-C6d	6/14/89	Direction Instrument, Magnetic (Gyroscopically Stabilized)
TSO-C7d	6/14/89	Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass)
TSO-C8d	8/8/91	Vertical Velocity Instruments (Rate-of-Climb)
TSO-C9c	9/15/60	Automatic Pilots
TSO-C10b	9/1/59	Altimeter, Pressure Actuated, Sensitive Type
TSO-C11e	10/17/91	Powerplant Fire Detection Instruments (Thermal and Flame Contact Types)
TSO-C13f	9/24/92	Life Preservers
TSO-C14b	2/15/90	Aircraft Fabric, Intermediate Grade
TSO-C15d	2/26/90	Aircraft Fabric, Grade A
TSO-C16 A-1	4/16/51	Airspeed Tubes (Electrically Heated)
TSO-C19b	5/1/58	Portable Water-Solution Type Fire Extinguishers
TSO-C20 A-1	4/16/51	Combustion Heaters
TSO-C21b	3/16/89	Aircraft Turnbuckle Assemblies and/or Turnbuckle Safetying Devices
TSO-C22g	3/5/93	Safety Belts
TSO-C23d	6/1/94	Personnel Parachute Assemblies
TSO-C25a	1/15/57	Aircraft Seats and Berths (Type I Transport, 6g Forward Load)
TSO-C26c	5/18/84	Aircraft Wheels and Wheel-Brake Assemblies, with Addendum I
TSO-C27 A-2	6/30/55	Twin Seaplane Floats
TSO-C28	3/15/52	Aircraft Skis
TSO-C30c	5/12/89	Aircraft Position Lights
TSO-C31d	4/30/84	High Frequency (HF) Radio Communications Transmitting Equipment Operating within the Radio Frequency Range of 1.5-30 Megahertz

**APPENDIX 1. INDEX OF TSO's IN NUMERICAL SEQUENCE**  
(Continued)

TSO NUMBER		SUBJECT TITLE
TSO-C32d	4/30/84	High Frequency (HF) Radio Communications Receiving Equipment Operating within the Radio Frequency Range 1.5-30 Megahertz
TSO-C34e	1/15/88	ILS Glide Slope Receiving Equipment Operating within the Radio Frequency Range of 328.6-335.4 Megahertz (MHz)
TSO-C35d	5/15/71	Airborne Radio Marker Receiving Equipment
TSO-C36e	1/25/88	Airborne ILS Localizer Receiving Equipment Operating within the Radio Frequency Range of 108-112 Megahertz (MHz)
TSO-C37d	9/23/92	VHF Radio Communications Transmitting Equipment Operating within the Radio Frequency Range 117.975 to 137.000 Megahertz
TSO-C38d	9/23/92	VHF Radio Communications Receiving Equipment Operating within the Radio Frequency Range 117.975 to 137.000 Megahertz
TSO-C39b	4/17/87	Aircraft Seats and Berths
TSO-C40c	1/25/88	VOR Receiving Equipment Operating within the Radio Frequency Range of 108-117.95 Megahertz (MHz)
TSO-C41d	5/6/85	Airborne Automatic Direction Finding (ADF) Equipment
TSO-C42	3/1/57	Propeller Feathering Hose Assemblies
TSO-C43c	5/30/95	Temperature Instruments
TSO-C44b	5/10/95	Fuel Flowmeters
TSO-C45a	2/28/95	Manifold Pressure Instruments
TSO-C46a	4/23/68	Maximum Allowable Airspeed Indicator Systems
TSO-C47	10/15/61	Pressure Instruments - Fuel, Oil, and Hydraulic
TSO-C48	4/1/59	Carbon Monoxide Detector Instruments
TSO-C49b	5/30/95	Electric Tachometer: Magnetic Drag (Indicator and Generator)
TSO-C50c	1/31/83	Audio Selector Panels and Amplifiers
TSO-C52b	5/30/95	Flight Director Equipment
TSO-C53a	2/1/61	Fuel and Engine Oil System Hose Assemblies
TSO-C54	10/15/61	Stall Warning Instruments
TSO-C55	4/1/59	Fuel and Oil Quantity Instruments (Reciprocating Engine Aircraft)
TSO-C56a	4/12/84	Engine-Driven Direct Current Generators/Starter-Generators
TSO-C57a	1/31/83	Headsets and Speakers

**APPENDIX 1. INDEX OF TSO's IN NUMERICAL SEQUENCE**  
(Continued)

<b>TSO NUMBER</b>		<b>SUBJECT TITLE</b>
TSO-C58a	1/31/83	Aircraft Microphones (Except Carbon)
TSO-C59	7/31/59	Airborne Selective Calling Equipment
TSO-C60b	5/11/88	Airborne Area Navigation Equipment Using Loran C Inputs
TSO-C62d	9/7/90	Tires
TSO-C63c	8/18/83	Airborne Weather and Ground Mapping Pulsed Radars
TSO-C64a	8/25/89	Oxygen Mask Assembly Continuous Flow, Passenger
TSO-C65a	8/18/83	Airborne Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment (For Air Carrier Aircraft)
TSO-C66c	1/18/91	Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 Megahertz
TSO-C67	11/15/60	Airborne Radar Altimeter Equipment (For Air Carrier Aircraft)
TSO-C68a	8/18/83	Airborne Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Ground Speed and Drift Angle Data (For Air Carrier Aircraft)
TSO-C69c	8/18/99	Emergency Evacuation Slides, Ramps, Ramp/Slides, and Slide/Rafts
TSO-C70a	4/13/84	Liferafts (Reversible and Nonreversible)
TSO-C71	6/15/61	Airborne Static ("DC to DC") Electrical Power Converter (For Air Carrier Aircraft)
TSO-C72c	2/19/87	Individual Flotation Devices
TSO-C73	9/13/63	Static Electrical Power Inverter
TSO-C74c	2/20/73	Airborne ATC Transponder Equipment
TSO-C75	9/4/63	Hydraulic Hose Assemblies
TSO-C76	3/1/63	Fuel Drain Valves
TSO-C77a	7/20/81	Gas Turbine Auxiliary Power Units
TSO-C78	2/10/67	Crewmember Demand Oxygen Masks
TSO-C79	11/12/63	Fire Detectors (Radiation Sensing Type)
TSO-C80	5/26/64	Flexible Fuel and Oil Cell Material
TSO-C85a	3/7/96	Survivor Locator Lights
TSO-C87	2/1/66	Airborne Low-Range Radio Altimeter
TSO-C88a	8/18/83	Automatic Pressure Altitude Reporting Code Generating Equipment

**APPENDIX 1. INDEX OF TSO's IN NUMERICAL SEQUENCE**  
(Continued)

TSO NUMBER		SUBJECT TITLE
TSO-C89	2/10/67	Oxygen Regulators, Demand
TSO-C90c	4/3/92	Cargo Pallets, Nets, and Containers
TSO-C91a	4/29/85	Emergency Locator Transmitter (ELT) Equipment
TSO-C92c	3/19/96	Airborne Ground Proximity Warning Equipment
TSO-C93		Airborne Interim Standard Microwave Landing System Converter Equipment
TSO-C94a	8/12/81	Omega Receiving Equipment Operating within the Radio Frequency Range of 10.2 to 13.6 Kilohertz
TSO-C95	8/18/83	Mach Meters
TSO-C96a	4/7/89	Anticollision Light Systems
TSO-C97	9/26/79	Lithium Sulfur Dioxide Batteries
TSO-C99	6/27/83	Protective Breathing Equipment
TSO-C101	2/19/87	Over Speed Warning Instruments
TSO-C102	4/2/84	Airborne Radar Approach and Beacon Systems for Helicopters
TSO-C103	4/12/84	Continuous Flow Oxygen Mask Assembly (For Non-Transport Category Aircraft)
TSO-C104	6/22/82	Microwave Landing System (MLS) Airborne Receiving Equipment
TSO-C105	6/13/84	Optional Display Equipment for Weather and Ground Mapping Radar Indicators
TSO-C106	1/15/88	Air Data Computer
TSO-C109	12/9/85	Airborne Navigation Data Storage System
TSO-C110a	10/26/88	Airborne Passive Thunderstorm Detection Equipment
TSO-C112	2/5/86	Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment
TSO-C113	10/27/86	Airborne Multipurpose Electronic Displays
TSO-C114	3/27/87	Torso Restraint Systems
TSO-C115b	9/30/94	Airborne Area Navigation Equipment Using Multi-Sensor Inputs
TSO-C116	3/1/90	Crewmember Protective Breathing Equipment
TSO-C117a	8/1/96	Airborne Windshear Warning and Escape Guidance Systems for Transport Airplanes

**APPENDIX 1. INDEX OF TSO's IN NUMERICAL SEQUENCE**  
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<b>TSO NUMBER</b>		<b>SUBJECT TITLE</b>
TSO-C118	8/5/88	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I
TSO-C119a	4/9/90	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS II
TSO-C120	1/26/88	Airborne Area Navigation Equipment Using Omega/VLF Inputs
TSO-C121	3/1/90	Underwater Locating Devices (Acoustic) (Self-Powered)
TSO-C122	4/11/94	Devices that Prevent Blocked Channels Used in Two-Way Radio Communications due to Simultaneous Transmissions
TSO-C123a	8/2/96	Cockpit Voice Recorder Systems
TSO-C124a	8/1/96	Flight Data Recorder Systems
TSO-C126	12/23/92	406 MHz Emergency Locator Transmitter (ELT)
TSO-C127a	8/21/98	Rotorcraft, Transport Airplane, and Normal and Utility Airplane Seating Systems
TSO-C128	7/20/93	Devices that Prevent Blocked Channels Used in Two-Way Radio Communications due to Unintentional Transmissions
TSO-C129a	2/20/96	Airborne Supplemental Navigation Equipment Using Global Positioning System (GPS)
TSO-C137	7/20/98	Aircraft Portable Megaphones
TSO-C141	8/17/99	Aircraft Fluorescent Lighting Ballast/Fixture Equipment
TSO-C142	4/4/00	Lithium Batteries
TSO-C144	3/12/98	Airborne Global Positioning System Antenna
TSO-C145	5/15/98	Airborne Navigation Sensors using the Global Positioning System (GPS) Augmented by the Wide Area Augmentation System (WAAS)
TSO-C146	10/6/99	Stand-Alone Airborne Navigation Equipment Using The Global Positioning System (GPS) Augmented By The Wide Area Augmentation System (WAAS)
TSO-C147	4/6/98	Traffic Advisory System (TAS) Airborne Equipment
TSO-C148	9/26/97	Aircraft Mechanical Fasteners
TSO-C149	4/24/98	Aircraft Bearings
TSO-C150	4/24/98	Aircraft Seals
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	Lithium Sulfur Dioxide Batteries	TSO-C97
<b>Cargo Load Devices</b>		
	Cargo Pallets, Nets, and Containers	TSO-C90c
<b>Collision and Weather Avoidance</b>		
	Airborne Ground Proximity Warning Equipment	TSO-C92c
	Airborne Passive Thunderstorm Detection Equipment	TSO-C110a
	Airborne Weather and Ground Mapping Pulsed Radars	TSO-C63c
	Optional Display Equipment for Weather and Ground Mapping Radar Indicators	TSO-C105
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	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS II	TSO-C119a
<b>Communication Equipment</b>		
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	Aircraft Portable Megaphones	TSO-C137
	Audio Selector Panels and Amplifiers	TSO-C50c
	Headsets and Speakers	TSO-C57a

APPENDIX 2. INDEX OF TSO's BY SUBJECT  
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SUBJECT	TSO TITLE	TSO NUMBER
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	High Frequency (HF) Radio Communications Transmitting Equipment Operating within the Radio Frequency Range of 1.5-30 Megahertz	TSO-C31d
	VHF Radio Communications Receiving Equipment Operating within the Radio Frequency Range 117.975 to 137.000 Megahertz	TSO-C38d
	VHF Radio Communications Transmitting Equipment Operating within the Radio Frequency Range 117.975 to 137.000 Megahertz	TSO-C37d
<b>Electrical Power</b>		
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	Engine-Driven Direct Current Generators/Starter-Generators	TSO-C56a
	Static Electrical Power Inverter	TSO-C73
<b>Equipment Furnishings</b>		
	Aircraft Fabric, Grade A	TSO-C15d
	Aircraft Fabric, Intermediate Grade	TSO-C14b
	Aircraft Fluorescent Lighting Ballast/Fixture Equipment	TSO-C141
	Aircraft Seats and Berths	TSO-C39b
	Aircraft Seats and Berths (Type I Transport, 6g Forward Load)	TSO-C25a
	Aircraft Turnbuckle Assemblies and/or Turnbuckle Safetying Devices	TSO-C21b
	Safety Belts	TSO-C22g
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<b>Evacuation and Survival Equipment</b>		
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**APPENDIX 2. INDEX OF TSO's BY SUBJECT**  
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<b>SUBJECT</b>	<b>TSO TITLE</b>	<b>TSO NUMBER</b>
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	Personnel Parachutes Assemblies	TSO-C23d
	Survivor Locator Light	TSO-C85a
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	Powerplant Fire Detection Instruments (Thermal and Flame Contact Types)	TSO-C11e
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	Fuel Flowmeters	TSO-C44b
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	Airborne Radar Altimeter Equipment (For Air Carrier Aircraft)	TSO-C67
	Airspeed Instruments	TSO-C2d
	Airspeed Tubes (Electrically Heated)	TSO-C16 A-1
	Altimeter, Pressure Actuated, Sensitive Type	TSO-C10b
	Automatic Pressure Altitude Reporting Code Generating Equipment	TSO-C88a
	Bank and Pitch Instruments	TSO-C4c
	Direction Instrument, Magnetic (Gyroscopically Stabilized)	TSO-C6d
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	Flight Director Equipment	TSO-C52b
	Fuel and Oil Quantity Instruments (Reciprocating Engine Aircraft)	TSO-C55
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	Manifold Pressure Instruments	TSO-C45a
	Maximum Allowable Airspeed Indicator Systems	TSO-C46a
	Over Speed Warning Instruments	TSO-C101
	Pressure Instruments - Fuel, Oil, and Hydraulic	TSO-C47
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	Temperature Instruments	TSO-C43c
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## APPENDIX 2. INDEX OF TSO's BY SUBJECT (Continued)

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	Airborne Area Navigation Equipment Using Multi-Sensor Inputs	TSO-C115b
	Airborne Area Navigation Equipment Using Omega/VLF Inputs	TSO-C120
	Airborne Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Ground Speed and Drift Angle Data (For Air Carrier Aircraft)	TSO-C68a
	Airborne Automatic Direction Finding (ADF) Equipment	TSO-C41d
	Airborne Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment (For Air Carrier Aircraft)	TSO-C65a
	Airborne Global Positioning System Antenna	TSO-C144
	Airborne ILS Localizer Receiving Equipment Operating within the Radio Frequency Range of 108-112 Megahertz (MHz)	TSO-C36e
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	Airborne Supplemental Navigation Equipment Using Global Positioning System (GPS)	TSO-C129a
	Airborne Windshear Warning and Escape Guidance Systems for Transport Airplanes	TSO-C117a
	Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 Megahertz	TSO-C66c
	ILS Glide Slope Receiving Equipment Operating within the Radio Frequency Range of 328.6-335.4 Megahertz (MHz)	TSO-C34e
	Microwave Landing System (MLS) Airborne Receiving Equipment	TSO-C104
	Omega Receiving Equipment Operating within the Radio Frequency Range of 10.2 to 13.6 Kilohertz	TSO-C94a
	Stand-Alone Airborne Navigation Equipment Using The Global Positioning System (GPS) Augmented By The Wide Area Augmentation System (WAAS)	TSO-C146
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